

In re Patent Application of:

**BELL ET AL**

Serial No. 10/719,203

Filed: **NOVEMBER 21, 2003**

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**REMARKS**

The Examiner is thanked for the examination of the present application. Applicants are, of course, disappointed that the Examiner maintained his rejection of the claims over the previously cited prior art despite indicating in a telephonic interview that the amendments would define over the prior art. Although the Examiner now takes the position that the amendments were not made as expected, Applicants respectfully note that the amendments were made exactly as discussed. The patentability of the claims is discussed below.

**I. The Claimed Invention**

The invention, as recited in independent Claim 1, for example, is directed to a mobile data collection system for use in a vehicle as it travels along a road. The mobile data collection system includes a positioning system to generate position and time data as the vehicle travels along the road, a down-looking line scan camera mounted on the vehicle and configured to obtain a series of line scan images of the road as the vehicle travels therealong, and a data collection controller connected to the positioning system and the line scan camera to associate line scan images with corresponding position and time data as the vehicle travels along the road.

Independent Claim 11 is directed to a similar mobile data collection system and further recites a wide-angle lens and an image processor. Independent Claim 19 is directed to a related method.

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## **II. The Claims Are Patentable**

The Examiner rejected the claims over the previously cited prior art. More particularly, the Examiner contended that the claims, which recite the down-looking line scan camera mounted on the vehicle and configured to obtain a series of line scan images, fail to fully, clearly, and concisely show how the line scan camera is configured.

Applicants respectfully submit that the Examiner is incorrect, as the independent claims recite a data collection controller connected to the positioning system and the line scan camera to associate line scan images with corresponding position and time data as the vehicle travels along the road. Moreover, the specification, dependent Claim 9, independent Claim 11, and dependent Claim 20 also recite an image processor, or image processing to identify and mark road features in the line scan images. These recitations show hardware and/or software collaborations.

Additionally, Applicants note that the Examiner contended that the phrase "for mounting on a vehicle to obtain a series of line scan images of the road as the vehicle travels therealong," as recited in independent Claim 1, for example, is merely an intended use. Applicants submit that the Examiner mischaracterized the claim recitation in that in Applicants' claim recites, "a down-looking line scan camera mounted on the vehicle and configured to obtain a series of line scan images of the road as the vehicle travels therealong. The claim recites that the down-looking line scan camera is mounted, and does not recite an intended use of the camera. Thus, a down-looking line

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scan camera is claimed, and not merely a new intended use for an old product, as contended by the Examiner.

The Examiner rejected independent Claims 1 and 19 as being unpatentable over the combination of Sakuma et al. and Martin. Sakuma et al. is directed to an apparatus and method for measuring the length and the relative moving speed of an object whereby a plurality of line scan cameras are synchronously operated and positioned transverse to the given track of a moving object, such as a vehicle. Framed images of the moving vehicle are correlated to determine a moving time interval. A relative moving speed of the vehicle is thereby determined.

The Examiner correctly recognized that Sakuma et al. fails to disclose a down-looking line scan camera mounted on the vehicle to obtain a series of line scan images of the road. The Examiner then turned to Martin for this critical deficiency. Martin is directed to a surveillance system whereby at least a portion of a captured image is transformed to eliminate distortion while magnifying the selected portion of the image. Martin is preferably implemented in the form of a single integrated circuit incorporating an image sensor array and an application specific integrated circuit coupled thereto. Martin further discloses using a fisheye lens as one method of capturing a video image.

Applicants submit that even a selective combination of Sakuma et al. and Martin fails to disclose the invention as recited in independent Claims 1 and 19. More particularly, even a selective combination of Sakuma et al. and Martin fails to disclose a down-looking line scan camera mounted on the vehicle

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and configured to obtain a series of line scan images of the road as the vehicle travels therealong. While the Examiner contended that "to obtain a series of line scan images of the road" is an inherent characteristic in the Sakuma et al. and Martin cameras, the Examiner's contention is flawed.

Neither Sakuma et al. nor Martin disclose a down-looking camera mounted on the vehicle and configured to obtain a series of line scan images of the road as the vehicle travels therealong. Instead, Sakuma et al. discloses line scan cameras that are positioned in a moving vehicle so as to take images of stationary vehicles (FIG. 2), or conversely, wherein the line scan cameras are positioned on a fixed overhead support to collect images of a moving vehicle (FIG. 19). Additionally, the Examiner contended that Col. 1, lines 35-57 of Martin disclose the critical deficiency of Sakuma et al. In contrast, Col. 1, lines 35-57 of Martin disclose capturing video through a fisheye lens, and processing the image in real-time to remove distortion.

Col. 1, lines 35-57 of Martin fail to disclose a down-looking line scan camera mounted on the vehicle and configured to obtain a series of line scan images of the road as the vehicle travels therealong. Accordingly, even a selective combination of Sakuma et al. and Martin fails to disclose the invention as recited in independent Claims 1 and 19.

Applicants further submit that the Examiner's combination of the Sakuma et al. and Martin prior art references is improper. A person having ordinary skill in the art would not be motivated to combine the measuring of the length and the relative moving speed of an object from Sakuma et al. with the

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distortion eliminating surveillance system of Martin in an attempt to produce the claimed invention.

Applicants further submit the Examiner's proposed combination of prior art references would destroy the operability of the primary reference, Sakuma et al. A fisheye lens distorts straight lines, and the overall image often suffers from distortion. (See e.g. the object of Martin). Employing a fisheye lens in Sakuma et al. would destroy the ability of the image acquiring apparatus to obtain clear images in short interval in order to determine a starting and ending point to obtain a relative moving speed. Moreover, Applicants' submit the Examiner is using hindsight reconstruction based on Applicants' own specification to combine disjoint pieces of the prior art.

The Examiner further rejected independent Claim 11 as being unpatentable over Sakuma et al., in view of Kimura and Martin. As discussed above, Sakuma et al. is directed toward an apparatus and method for measuring the length and the relative moving speed of an object. The Examiner correctly recognized that Sakuma et al. does not disclose a down-looking line scan camera with an attached wide angle lens mounted on the vehicle to obtain a series of line scan images of the road. The Examiner then turned to Martin for this noted deficiency.

Martin is directed toward surveillance systems whereby at least a portion of a captured image is transformed to eliminate distortion while magnifying the selected portion of the image. Martin is preferably implemented in the form of a single integrated circuit incorporating an image sensor array and an application specific integrated circuit coupled thereto. Martin

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further discloses using a fisheye lens as one method of capturing a video image. The Examiner further recognized that even a combination of Sakuma et al. and Martin does not disclose the claimed invention since the combination does not disclose an image processor to identify and mark road features in the line scan images.

The Examiner then turned to Kimura for this critical deficiency. Kimura is directed to a navigation apparatus that allows the map matching to determine a vehicle position after encountering a fork. The apparatus has a CCD camera for taking images of a road and includes a lane marker detector.

Applicants submit that independent Claim 11 is patentable for at least the reasons stated above. Additionally, Applicants further submit that the Examiner's combination of the Sakuma et al., Martin, and Kimura prior art references is improper. A person having ordinary skill in the art would not be motivated to combine the measuring of the length and the relative moving speed of an object from Sakuma et al. with the distortion eliminating surveillance system of Martin and the map matching of Kimura to arrive at the mobile mapping and road database management system in an attempt to produce the claimed invention.

Accordingly, independent Claim 11 is likewise patentable over the prior art.

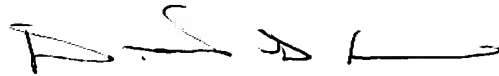
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**CONCLUSION**

In view of the arguments provided herein, it is submitted that all the claims are patentable. Accordingly, a Notice of Allowance is requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,



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